No. 8300126

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Jacob Hartz Seed Co, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'Hartz 5171'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 28th *day of* September *in the year of our Lord one thousand nine hundred and* eighty-four.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

John R Block
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO.0581-0055

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
Jacob Hartz Seed Co., Inc.	H78-766	~~Undecided~~ HARTZ 5171 HS 7/19/83

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*	5. PHONE *(Include area code)*	FOR OFFICIAL USE ONLY
P. O. Box 946, N. Park Avenue Stuttgart, Arkansas 72160	501/673-8565	PVPO NUMBER 8300126

6. GENUS AND SPECIES NAME	7. FAMILY NAME *(Botanical)*	FILING DATE / TIME
Glycine max	Leguminosea	5/11/83 8:00 [X] A.M. [ ] P.M.

8. KIND NAME	9. DATE OF DETERMINATION	FEES RECEIVED
Soybean	1981	AMOUNT FOR FILING: $1,000 DATE: 5/11/83 AMOUNT FOR CERTIFICATE: $ 500.00 DATE: 9/7/84

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*

Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION
Arkansas	1948

13. NAME AND ADDRESS OF APPLICANT REPRESENATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Jacob Hartz Seed Co., Inc.
P. O. Box 946, N. Park Avenue
Stuttgart, AR 72160

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. [X] Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*

b. [X] Exhibit B, Novelty Statement

c. [X] Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*

d. [X] Exhibit D, Additional Description of the Variety

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* [ ] Yes *(If "Yes," answer items 16 and 17 below)* [X] No R/S

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
[ ] Yes [ ] No	[ ] Foundation [ ] Registered [ ] Certified

18. DID THE APPLICANT(S) FILE FOR PROTECTION OF THE VARIETY IN THE U.S. OR OTHER COUNTRIES?

In U.S. as of May 6, 1983

[X] Yes *(If "Yes," give names of countries and dates)*

[ ] No

19. HAVE RIGHTS BEEN GRANTED IN THE U.S. OR OTHER COUNTRIES?

[ ] Yes *(If "Yes," give names of countries and dates)*

[X] No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Curtis Williams Director of Research	May 6, 1983
SIGNATURE OF APPLICANT	DATE

FORM LMGS-470 (9-81) (Edition of 1-78 is obsolete)

EXHIBIT A

ORIGIN AND BREEDING HISTORY OF THE VARIETY

'HARTZ 5171' <H78-766> originated from one F_4 plant (F_5 line) selected from the cross D66-12392 x 'Essex'. D66-12392 is a selection from D63-6100 x 'Dyer' made at Stoneville, Mississippi by Dr. E. E. Hartwig.

The F_2 and F_3 generations were advanced by modified single seed descent during the fall and winter of 1976-77. The F_4 bulk population was grown at Stuttgart the summer of 1977 from which single plants were selected. In 1978, F_5 single plant rows were grown at Stuttgart and row 766 was selected for yield testing.

'HARTZ 5171' <H78-766> was performance tested in Hartz Variety Tests in 1979-82. Disease and nematode screening were conducted in Hartz field tests and/or in the greenhouse. In 1982, H78-766 was grown in state experiment station tests in Arkansas, Alabama, Louisiana, Tennessee and Georgia.

Evidence of stability - 'HARTZ 5171' <H78-766> is stable for flower color, pubescence color, maturity, resistance to bacterial pustule, resistance to Race 3 of the cyst nematode, resistance to the reniform nematode and hilum color.

Kinds of variants - Only the usual environmental variations have been observed for intensity of the pigment in the hilum and seed size in 'HARTZ 5171' <H78-766>. Hilum color will vary from very light to very dark buff, depending on environmental conditions.

8300126

JACOB HARTZ SEED Company, Inc.

Telephone (501) 673-8565/TWX: 910-720-6244 P.O. Box 946 — Stuttgart, Arkansas 72160

June 20, 1984

Mr. Robert J. Snyder, Examiner
Plant Variety Protection Office
National Agricultural Library Building
Beltsville, MD 20705

EXHIBIT A

Dear Mr. Snyder:

Subject: Soybean Applications: No. 8300126 'Hartz 5171'
No. 8300127 'Hartz 6383'
No. 8300128 'Hartz 5370'
No. 8300129 'Hartz 7126'
No. 8300130 'Hartz 5252'

This is in response to your letter of May 31 concerning the uniformity and stability of the five Hartz soybean varieties listed above.

1. Uniformity: The variants described in Exhibit A of the Application for Plant Variety Protection are acceptable to the industry. They do not represent either a nutritional or economic effect on the variety for either the farmer or end user. Each year we have tried unsuccessfully to eliminate all the variants by roguing. However, the variants have not exceeded those listed in Exhibit A.

2. Stability: Each of the varieties are stable for the major morphological characters. The seed can be produced through three generations from Breeders seed (Foundation through Certified seed) without significant change. However, the usual care in roguing, combining, and seed cleaning must be followed as with all varieties. Hartz 5171, Hartz 6383, Hartz 7126, and Hartz 5252 have been produced for two years under commercial conditions and were inspected in the field and laboratory by the Arkansas State Plant Board for certification. Hartz 5370 was grown commercially for the first time in 1983. We have had certification problems with a few lots, but the problems were all judged to be due to mechanical mixture.

Thank you.

Sincerely,

JACOB HARTZ SEED COMPANY, INC.

Curtis Williams

Curtis Williams
Director of Research

CW/mjt

Quality HARTZ SEEDS

3

EXHIBIT B

NOVELTY STATEMENT

'HARTZ 5171' <H78-766> is a high yielding Maturity Group V cultivar, with resistance to bacterial pustule, frogeye leafspot, Race 3 of the soybean cyst nematode and the reniform nematode. It has field tolerance to Phytophthora root rot. 'HARTZ 5171' <H78-766> is susceptible to the root-knot nematode Meloidogyne incognita.

It has white flowers, gray pubescence, tan pod wall, yellow seed with a buff hila and determinate growth habit. Two seeds per pound with black hila producing tawny pubescent plants may be present. Plants of 'HARTZ 5171' <H78-766> can be distinguished from other Group V cultivars by various plant and disease resistance traits: from Forrest, Bedford, Mack, Pioneer 9561, A5474 and Deltapine 345 by pubescence color; from Dare, Essex, Bay, A5618 and Deltapine 105 by cyst nematode resistance.

Most similar variety: 'HARTZ 5171' <H78-766> is most similar to Bay, however, 'HARTZ 5171' <H78-766> has white flowers and is resistant to Race 3 of the cyst nematode, while Bay is susceptible and has purple flowers.

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (Glycine max L.)

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Jacob Hartz Seed Co., Inc.	H78-766	~~Undesignated~~ 'HARTZ 5171'

ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
P. O. Box 946, N. Park Avenue
Stuttgart, Arkansas 72160

FOR OFFICIAL USE ONLY
PVPO NUMBER
8300126

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., [0][9]).

1. SEED SHAPE:

[2]

1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other *(Specify)* _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

[2] 1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)

[1][2] Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)

[1] 1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other *(Specify)* _____

6. COTYLEDON COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:

[ ] 1 = Low 2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

[ ] 1 = Type A ($SP1^a$) 2 = Type B ($SP1^b$)

9. HYPOCOTYL COLOR:

[1] 1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:

[3] 1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other *(Specify)* _____

5

11. LEAFLET SIZE:

[2] 1 = Small ('Amsoy 71'; 'A5312') 2 = Medium ('Corsoy 79'; 'Gasoy 17')
3 = Large ('Crawford'; 'Tracy')

12. LEAF COLOR:

[1] 1 = Light Green ('Weber'; 'York') 2 = Medium Green ('Corsoy 79'; 'Braxton')
3 = Dark Green ('Gnome'; 'Tracy')

13. FLOWER COLOR:

[1] 1 = White 2 = Purple 3 = White with purple throat

14. POD COLOR:

[1] 1 = Tan 2 = Brown 3 = Black

15. PLANT PUBESCENCE COLOR:

[1] 1 = Gray 2 = Brown (Tawny)

16. PLANT TYPES:

[2] 1 = Slender ('Essex'; 'Amsoy 71') 2 = Intermediate ('Amcor'; 'Braxton')
3 = Bushy ('Gnome'; 'Govan')

17. PLANT HABIT:

[1] 1 = Determinate ('Gnome'; 'Braxton') 2 = Semi-Determinate ('Will')
3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

[0][8] 1 = 000 2 = 00 3 = 0 4 = I 5 = II 6 = III 7 = IV 8 = V
9 = VI 10 = VII 11 = VIII 12 = IX 13 = X

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

[2] Bacterial Pustule *(Xanthomonas phaseoli* var. *sojensis)*

[0] Bacterial Blight *(Pseudomonas glycinea)*

[0] Wildfire *(Pseudomonas tabaci)*

FUNGAL DISEASES:

[1] Brown Spot *(Septoria glycines)*

Frogeye Leaf Spot *(Cercospora sojina)*

[-] Race 1 [-] Race 2 [-] Race 3 [-] Race 4 [-] Race 5 [2] Other *(Specify)* Race Undetermined

[0] Target Spot *(Corynespora cassiicola)*

[2] Downy Mildew *(Peronospora trifoliorum* var. *manshurica)*

[0] Powdery Mildew *(Microsphaera diffusa)*

[0] Brown Stem Rot *(Cephalosporium gregatum)*

[0] Stem Canker *(Diaporthe phaseolorum* var. *caulivora)*

6

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

[0] Pod and Stem Blight *(Diaporthe phaseolorum* var; *sojae)*

[0] Purple Seed Stain *(Cercospora kikuchii)*

[0] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma* var. *sojae)*

[1] Race 1 [1] Race 2 [1] Race 3 [1] Race 4 [0] Race 5 [0] Race 6 [1] Race 7

[0] Race 8 [0] Race 9 [ ] Other *(Specify)* _____

VIRAL DISEASES:

[0] Bud Blight (Tobacco Ringspot Virus)

[0] Yellow Mosaic (Bean Yellow Mosaic Virus)

[0] Cowpea Mosaic (Cowpea Chlorotic Virus)

[0] Pod Mottle (Bean Pod Mottle Virus)

[0] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

[0] Race 1 [0] Race 2 [2] Race 3 [1] Race 4 [0] Other *(Specify)* _____

[0] Lance Nematode *(Hoplolaimus Colombus)*

[1] Southern Root Knot Nematode *(Meloidogyne incognita)*

[0] Northern Root Knot Nematode *(Meloidogyne Hapla)*

[0] Peanut Root Knot Nematode *(Meloidogyne arenaria)*

[2] Reniform Nematode *(Rotylenchulus reniformis)*

[ ] OTHER DISEASE NOT ON FORM *(Specify):* _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[0] Iron Chlorosis on Calcareous Soil

[ ] Other *(Specify)* _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[0] Mexican Bean Beetle *(Epilachna varivestis)*

[0] Potato Leaf Hopper *(Empoasca fabae)*

[ ] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape		Seed Coat Luster	
Leaf Shape		Seed Size	
Leaf Color		Seed Shape	
Leaf Size		Seedling Pigmentation	
			7

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	1/ NO. OF DAYS MATURITY	2/ PLANT LODGING SCORE	3/ CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	4/ % Protein	4/ % Oil		
<H78-766> Submitted HARTZ 5171	120	2.3	94	N/A	N/A	40.0	20.8	12.3	2 and 3
Forrest Name of Similar Variety	118	1.8	85	N/A	N/A	40.6	20.5	11.7	2 and 3

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A_2 in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

1/ Planted June 1, 1982 at Stuttgart 2/ 15 tests 3/ 14 tests 4/ 11 tests

EXHIBIT D

Table 1. Agronomic and other distinguishing characteristics of H78-766, Forrest and Bedford soybeans in Jacob Hartz Seed Company tests.

Trait	Cultivar 'HARTZ 5171' (H78-766)	Forrest	Bedford
Seed size (g/100)[1/]	12.3	11.7	11.7
Maturity (day in October)[2/]	8	5	8
Plant height (centimeters)[3/]	94	84	99
(inches)	37	33	39
Seed quality score*[4/]	1.7	1.9	2.0
Lodging score*[5/]	2.3	1.8	2.6
Flower Color	White	White	White
Pubescence color	Gray	Brown	Brown
Pod wall color	Tan	Tan	Tan
Hilum color	Buff	Black	Black
Cyst nematode (Race 3)	Res.	Res.	Res.
Reniform nematode	Res.	Res.	Res.
Root-knot nematode	Sus.	Res.	Res.

1/ 11 tests 2/ 6 tests 3/ 14 tests 4/ 10 tests 5/ 15 tests

* Seed quality was scored 1=very good to 5=very poor. Lodging was scored 1=almost all plants erect to 5=all plants down badly.

EXHIBIT D

BASIS OF APPLICANT'S OWNERSHIP

Jacob Hartz Seed Company, Incorporated, Stuttgart, Arkansas established a plant breeding program in 1972 for the purpose of developing, releasing, and maintaining stocks of soybean varieties developed by its plant breeding program.

Dr. Curtis Williams, plant breeder, was licensed to breed soybeans by the Arkansas State Plant Board, December 9, 1977. Dr. Williams and co-workers developed and tested this variety in trials at Stuttgart, Arkansas.